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Chraime et al.

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(54) **SYSTEMS AND METHODS FOR SLEEP MANAGEMENT**

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(51) **Int. Cl.**
G08B 21/00 (2006.01)

(52) **U.S. Cl.**
USPC **340/309.16**; 340/309.3; 340/286.02; 340/575; 340/384.1; 368/9; 368/13

(58) **Field of Classification Search**
USPC 340/309.3, 309.16, 575, 286.02, 384.1; 368/9–14
See application file for complete search history.

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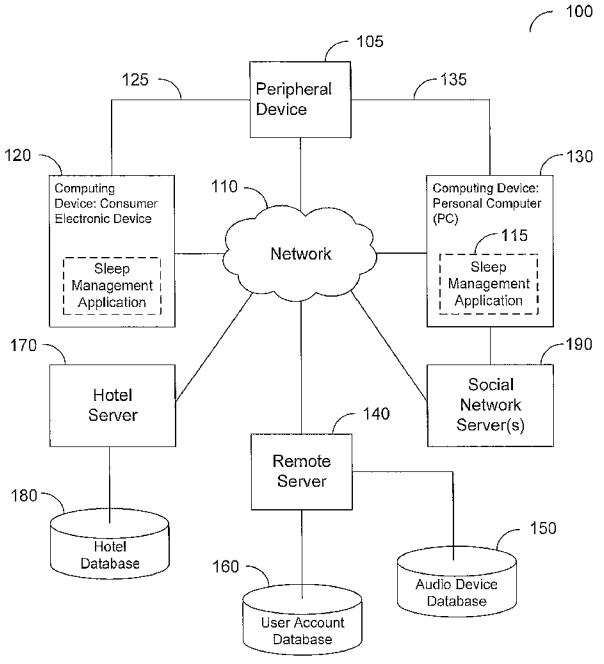
(57) **ABSTRACT**

A sleep management application on a computing device having a processor and a storage medium executes code that establishes to a server that maintains data pertaining to the computing device or to a user, retrieves data from the remote server, and generates a custom interface to configure a feature of the computing device. The custom interface is used to program a sleep management setting. In one implementation, a method uses the sleep management application to provide an alarm function using external data from a remote server. The sleep management application can receive the external data from the remote server and analyze the external data to identify elements that pertain to the sleep management application. Then, the sleep management application can generate a control signal based on the elements, and modify a setting governing an operation of the alarm function in accordance with the control signal.

15 Claims, 14 Drawing Sheets



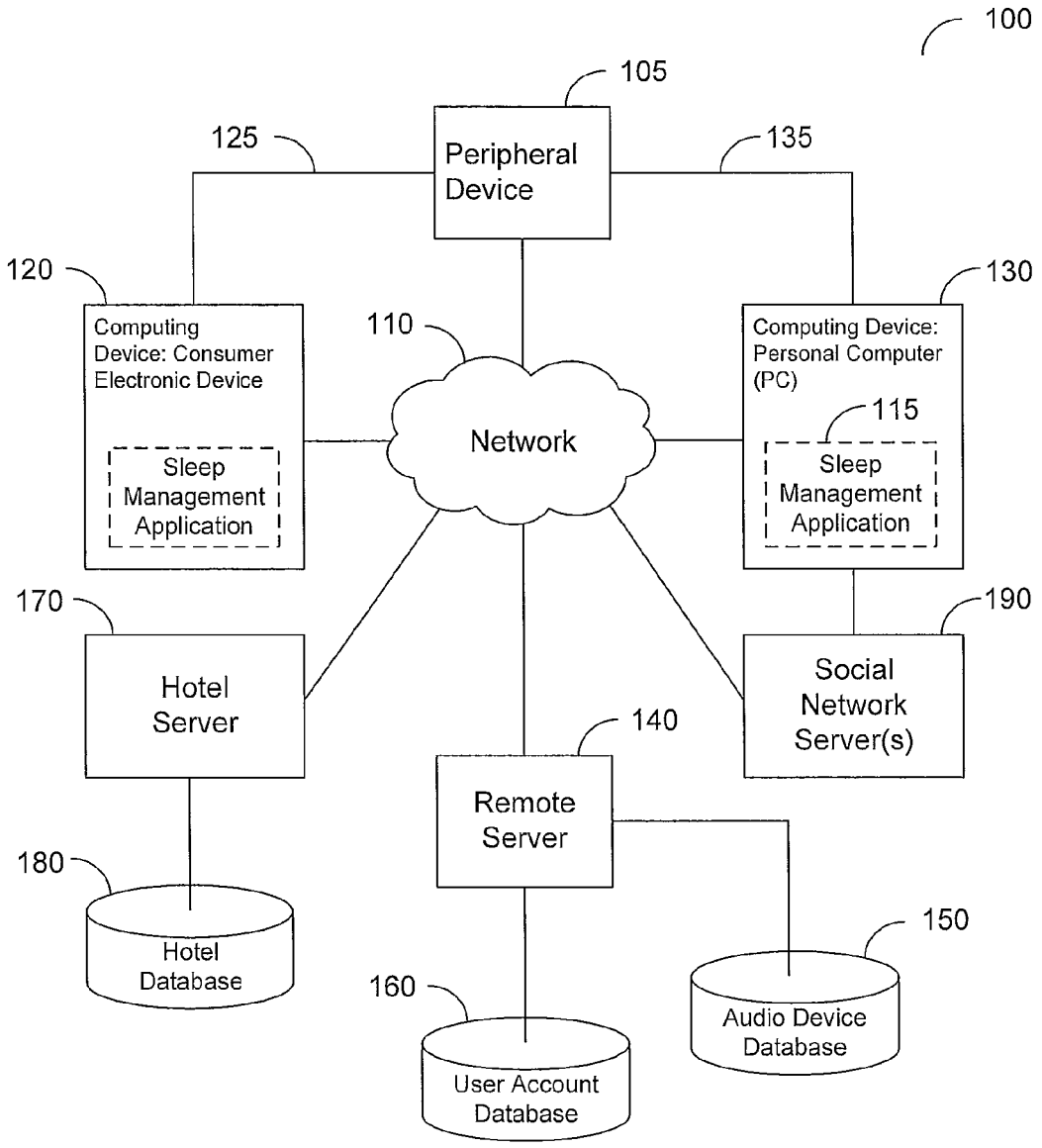

100
105
Peripheral Device
125
135
120
Computing Device: Consumer Electronic Device
Sleep Management Application
110
Network
130
Computing Device: Personal Computer (PC)
115
Sleep Management Application
170
Hotel Server
190
Social Network Server(s)
140
Remote Server
180
Hotel Database
150
Audio Device Database
160
User Account Database

FIG. 1

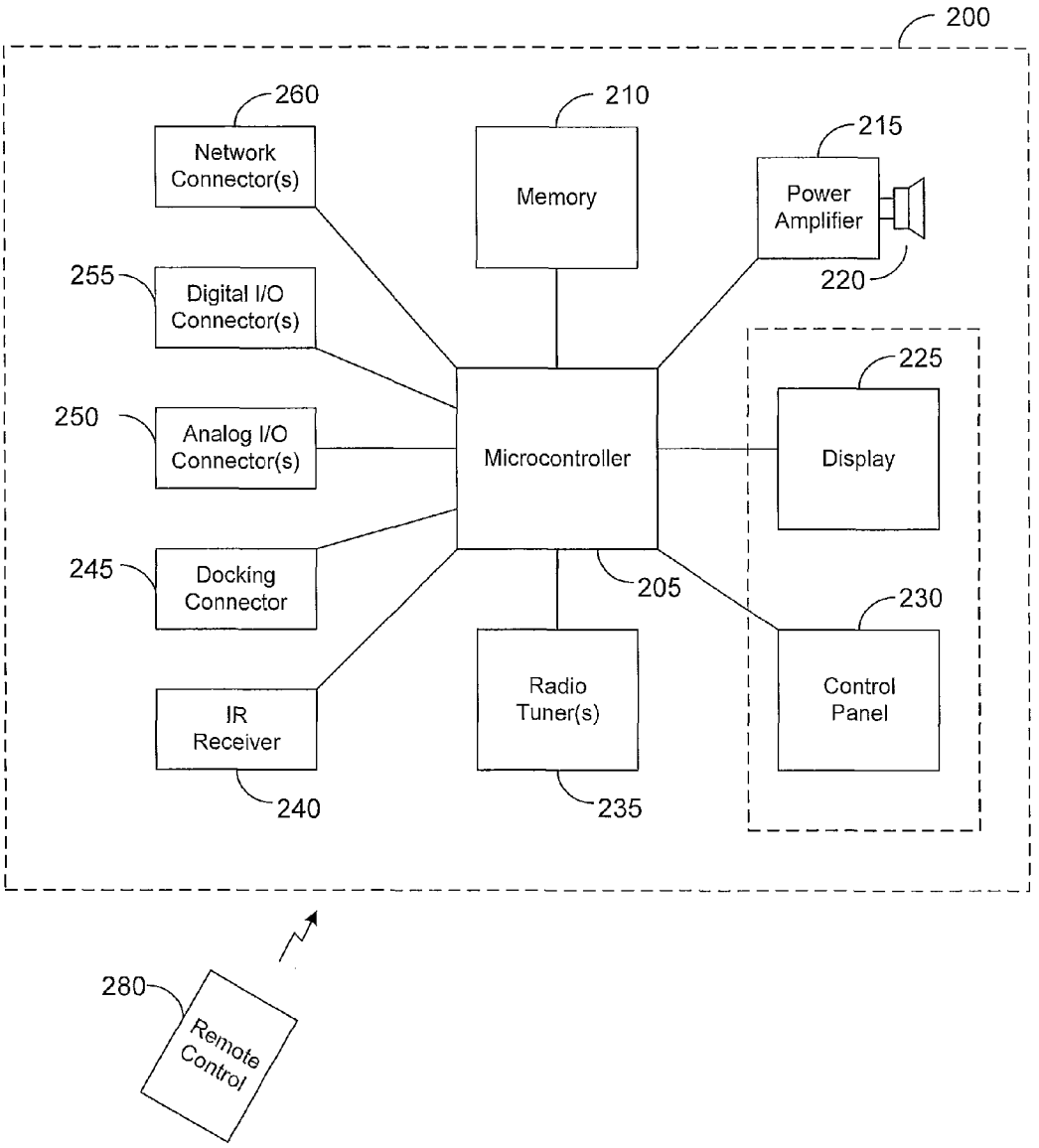

200
260
Network Connector(s)
210
Memory
215
Power Amplifier
220
255
Digital I/O Connector(s)
250
Analog I/O Connector(s)
Microcontroller
225
Display
245
Docking Connector
205
230
Control Panel
IR Receiver
240
Radio Tuner(s)
235
280
Remote Control

FIG. 2

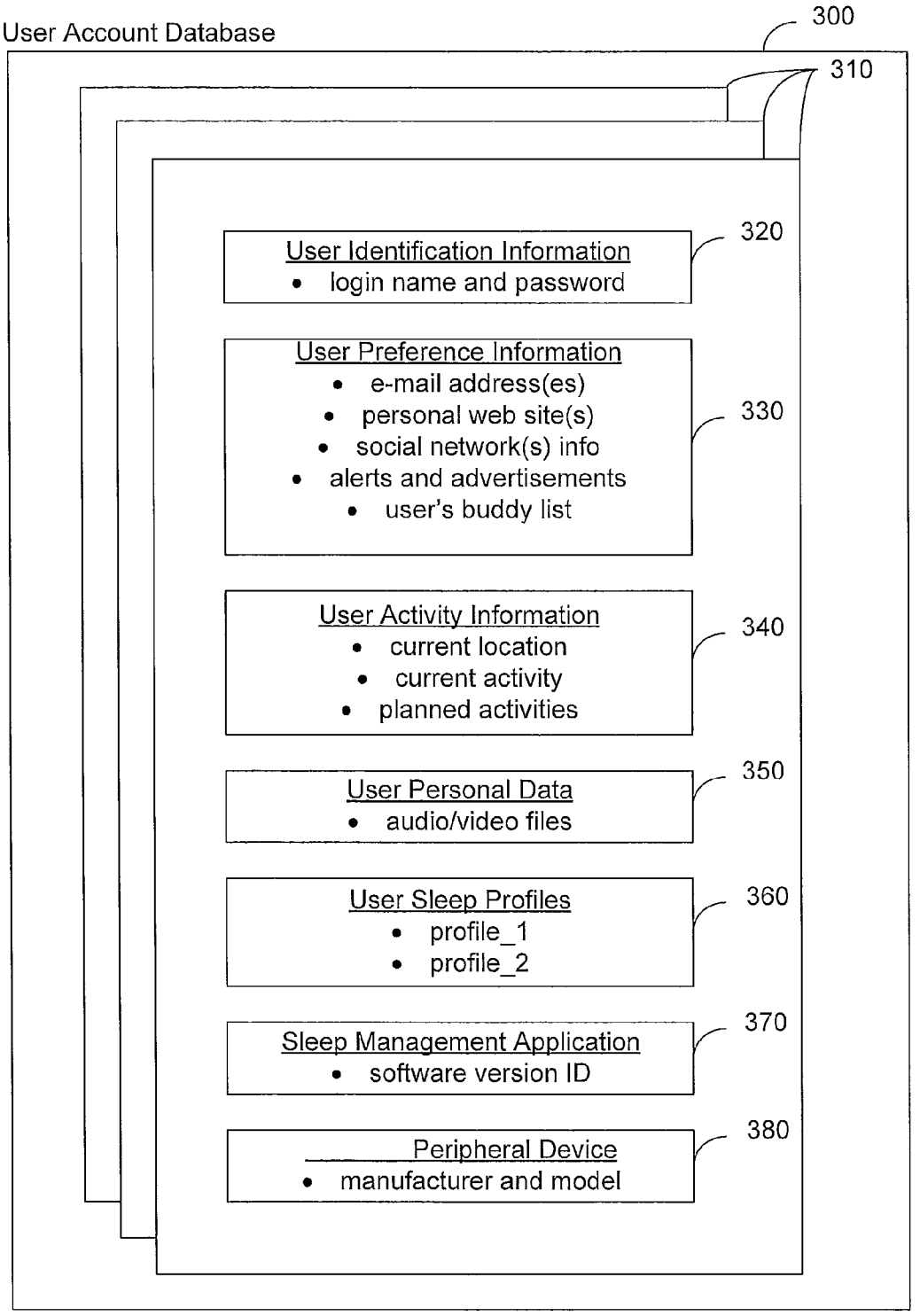

User Account Database
300
310
User Identification Information
• login name and password
320
User Preference Information
• e-mail address(es)
• personal web site(s)
• social network(s) info
• alerts and advertisements
• user's buddy list
330
User Activity Information
• current location
• current activity
• planned activities
340
User Personal Data
• audio/video files
350
User Sleep Profiles
• profile_1
• profile_2
360
Sleep Management Application
• software version ID
370
Peripheral Device
• manufacturer and model
380

FIG. 3A

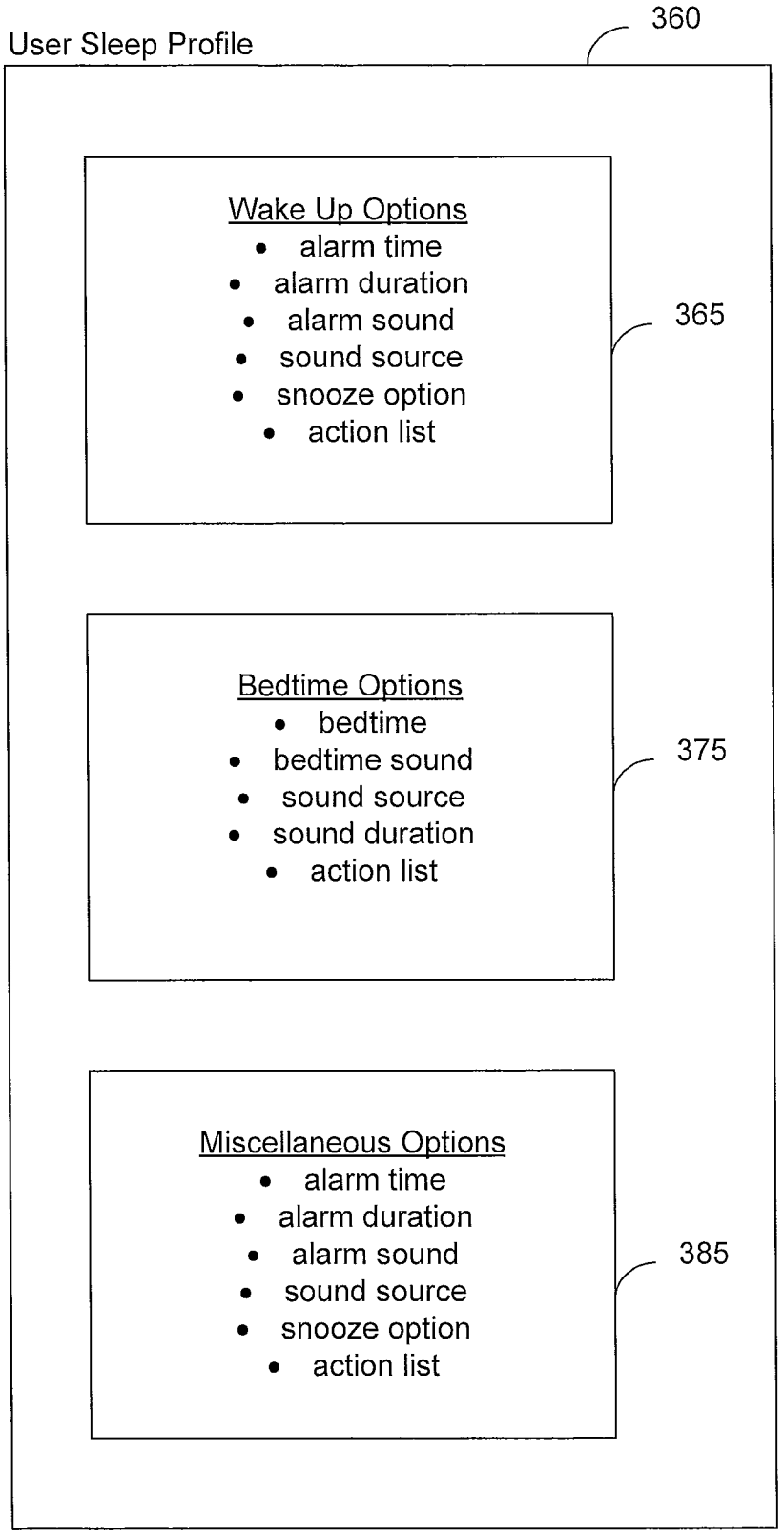

User Sleep Profile
360
Wake Up Options
• alarm time
• alarm duration
• alarm sound
• sound source
• snooze option
• action list
365
Bedtime Options
• bedtime
• bedtime sound
• sound source
• sound duration
• action list
375
Miscellaneous Options
• alarm time
• alarm duration
• alarm sound
• sound source
• snooze option
• action list
385

FIG. 3B

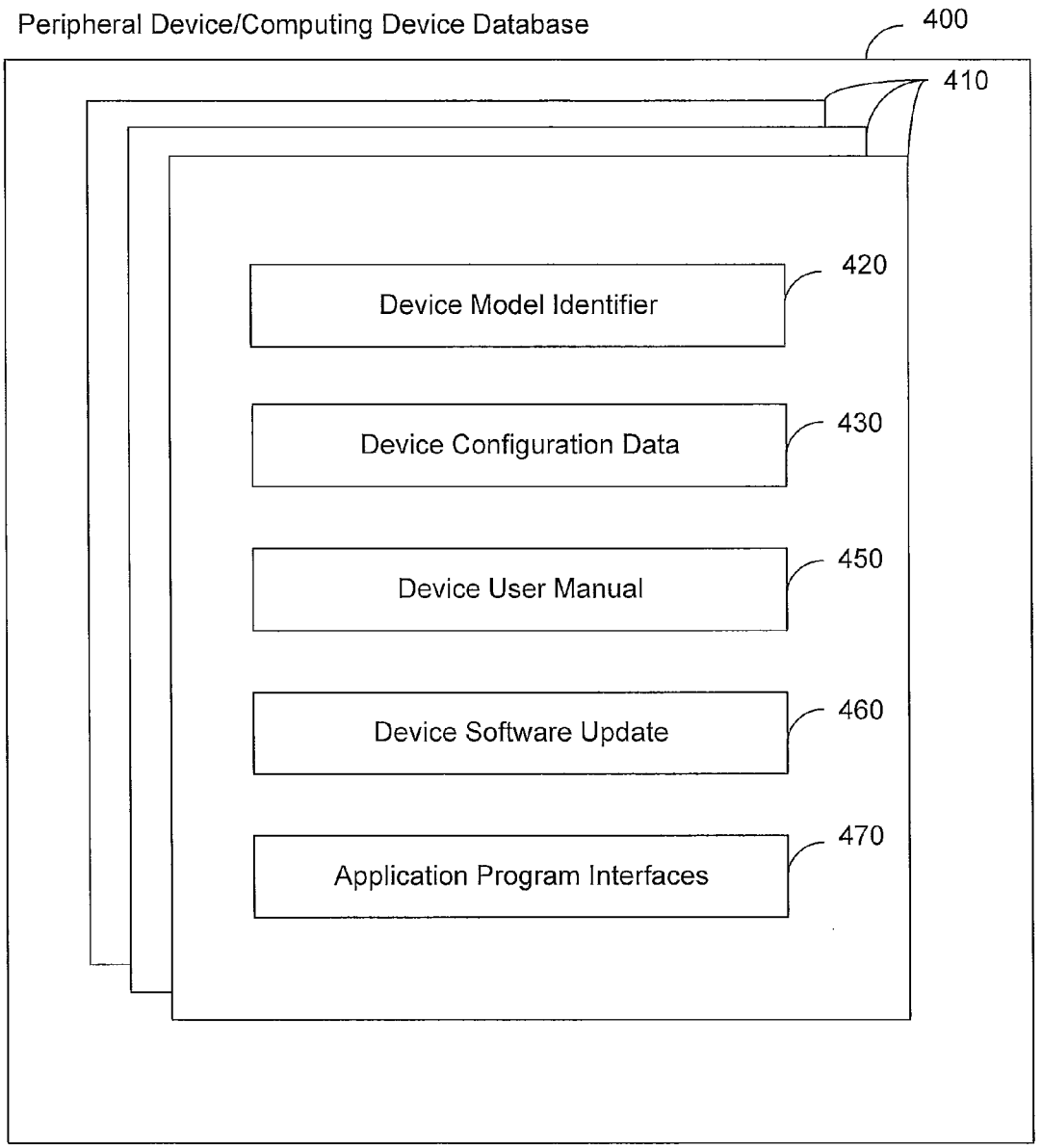

Peripheral Device/Computing Device Database
400
410
Device Model Identifier
420
Device Configuration Data
430
Device User Manual
450
Device Software Update
460
Application Program Interfaces
470

FIG. 4

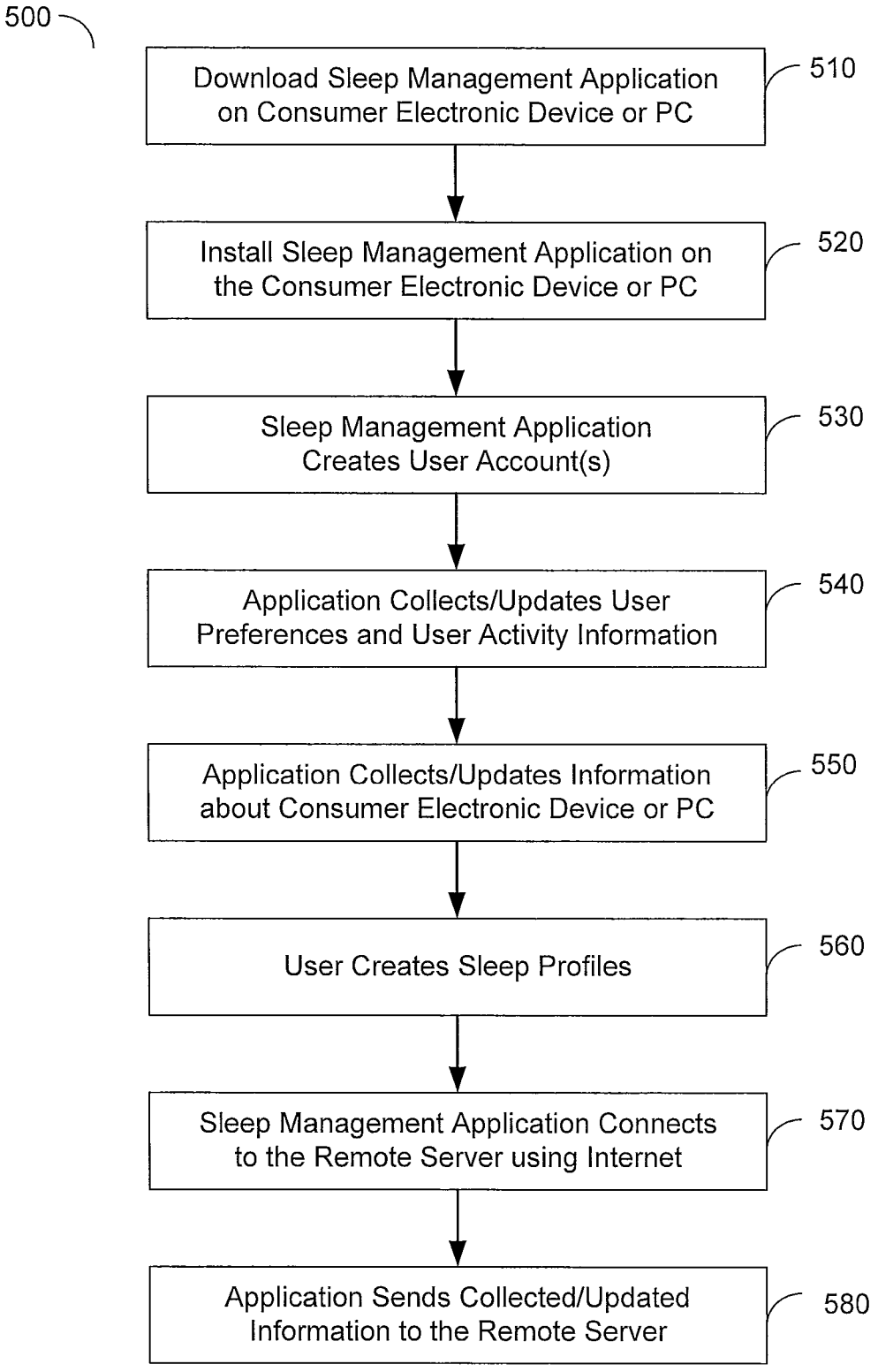

500
Download Sleep Management Application on Consumer Electronic Device or PC
510
Install Sleep Management Application on the Consumer Electronic Device or PC
520
Sleep Management Application Creates User Account(s)
530
Application Collects/Updates User Preferences and User Activity Information
540
Application Collects/Updates Information about Consumer Electronic Device or PC
550
User Creates Sleep Profiles
560
Sleep Management Application Connects to the Remote Server using Internet
570
Application Sends Collected/Updated Information to the Remote Server
580

FIG. 5

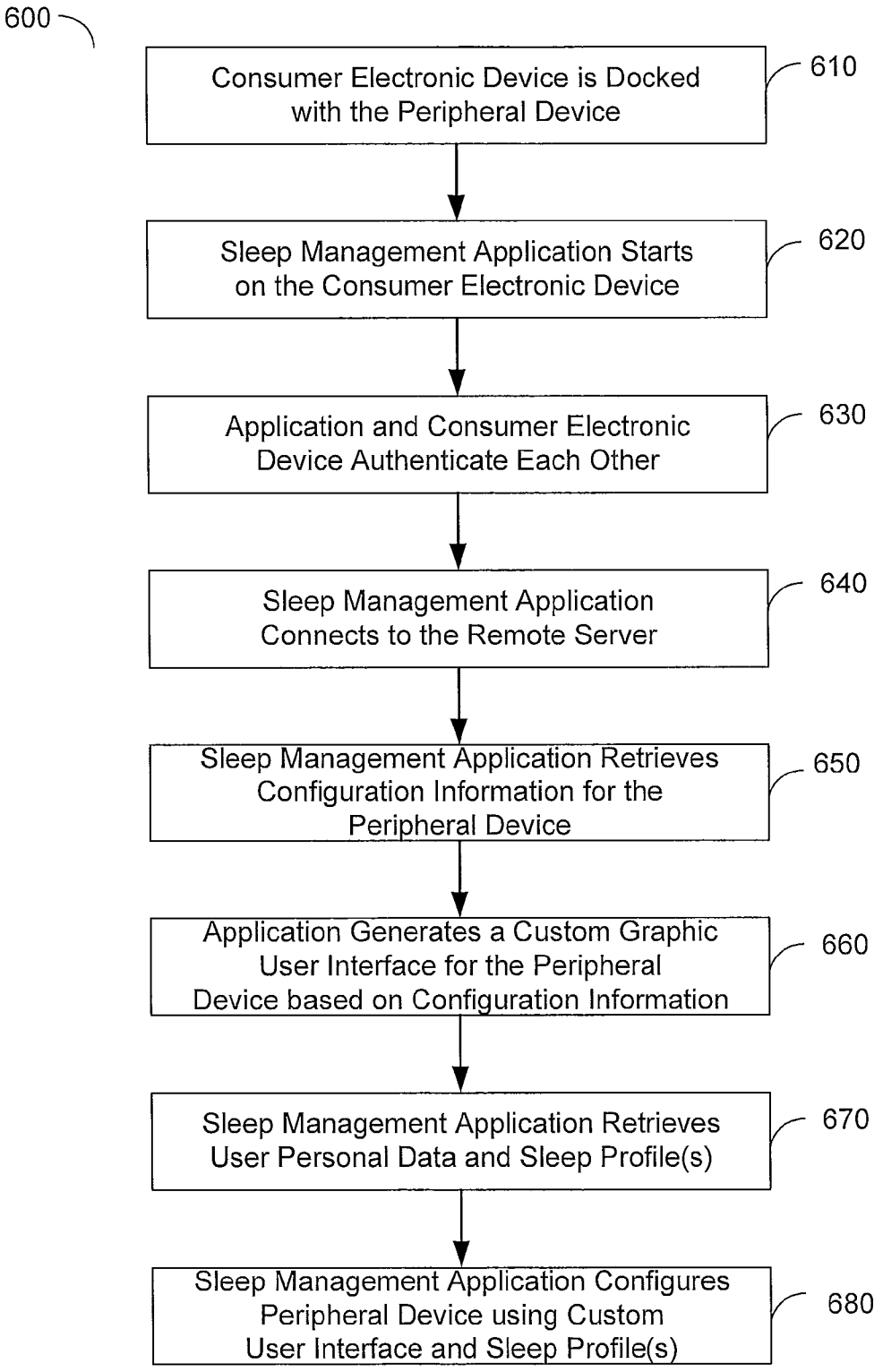

600
Consumer Electronic Device is Docked with the Peripheral Device
610
Sleep Management Application Starts on the Consumer Electronic Device
620
Application and Consumer Electronic Device Authenticate Each Other
630
Sleep Management Application Connects to the Remote Server
640
Sleep Management Application Retrieves Configuration Information for the Peripheral Device
650
Application Generates a Custom Graphic User Interface for the Peripheral Device based on Configuration Information
660
Sleep Management Application Retrieves User Personal Data and Sleep Profile(s)
670
Sleep Management Application Configures Peripheral Device using Custom User Interface and Sleep Profile(s)
680

FIG. 6

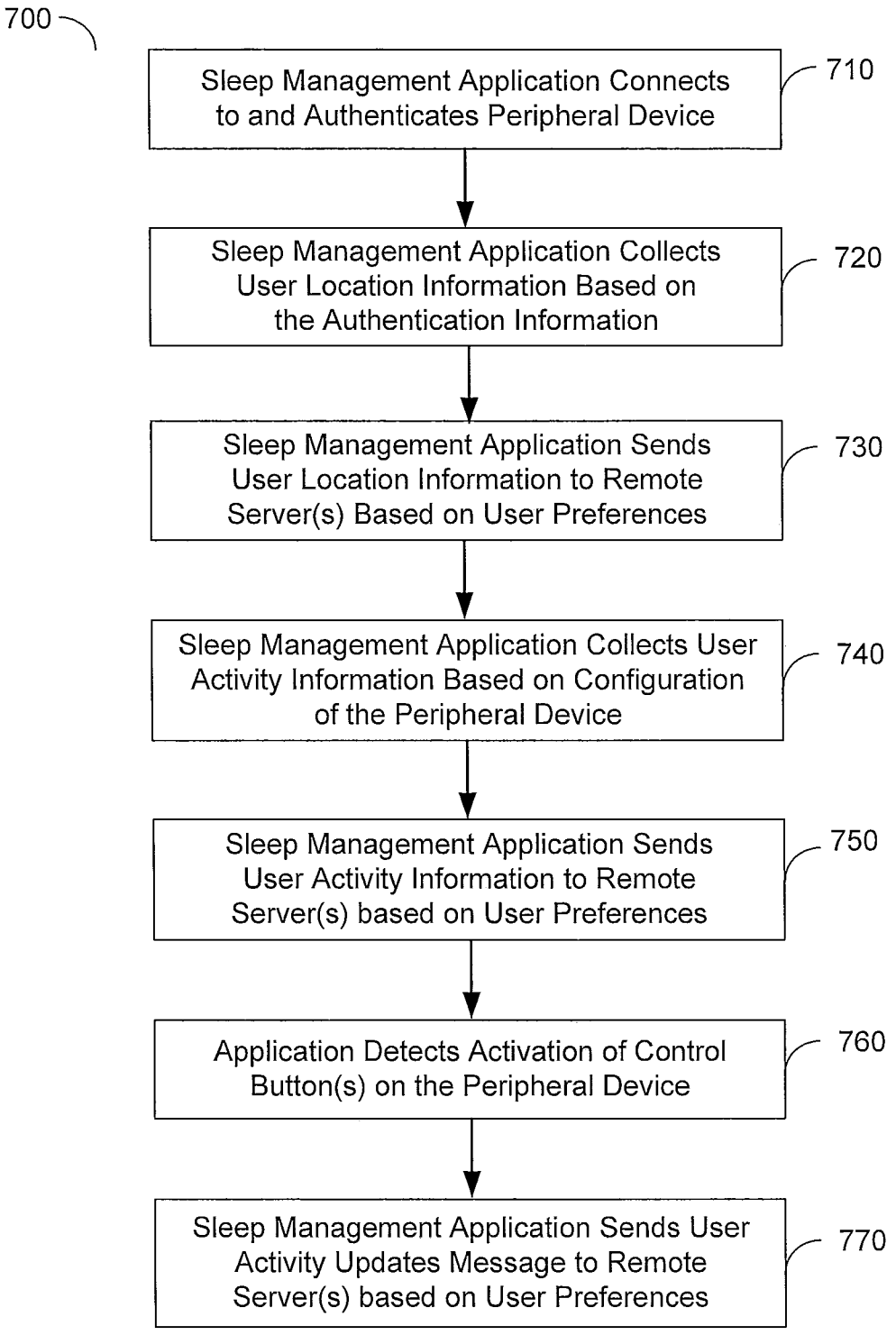

700
Sleep Management Application Connects to and Authenticates Peripheral Device
710
Sleep Management Application Collects User Location Information Based on the Authentication Information
720
Sleep Management Application Sends User Location Information to Remote Server(s) Based on User Preferences
730
Sleep Management Application Collects User Activity Information Based on Configuration of the Peripheral Device
740
Sleep Management Application Sends User Activity Information to Remote Server(s) based on User Preferences
750
Application Detects Activation of Control Button(s) on the Peripheral Device
760
Sleep Management Application Sends User Activity Updates Message to Remote Server(s) based on User Preferences
770

FIG. 7

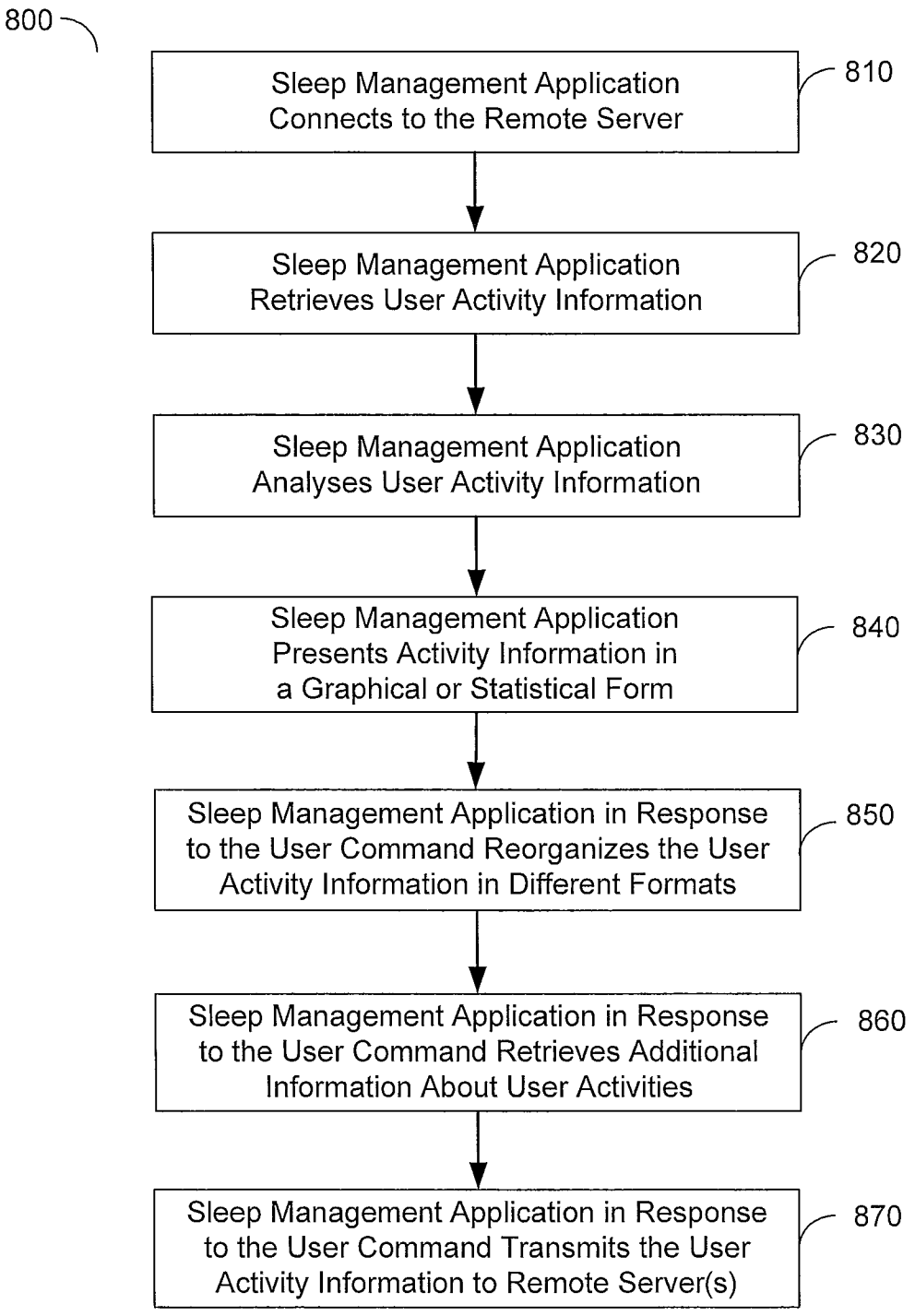

800
Sleep Management Application Connects to the Remote Server
810
Sleep Management Application Retrieves User Activity Information
820
Sleep Management Application Analyses User Activity Information
830
Sleep Management Application Presents Activity Information in a Graphical or Statistical Form
840
Sleep Management Application in Response to the User Command Reorganizes the User Activity Information in Different Formats
850
Sleep Management Application in Response to the User Command Retrieves Additional Information About User Activities
860
Sleep Management Application in Response to the User Command Transmits the User Activity Information to Remote Server(s)
870

FIG. 8

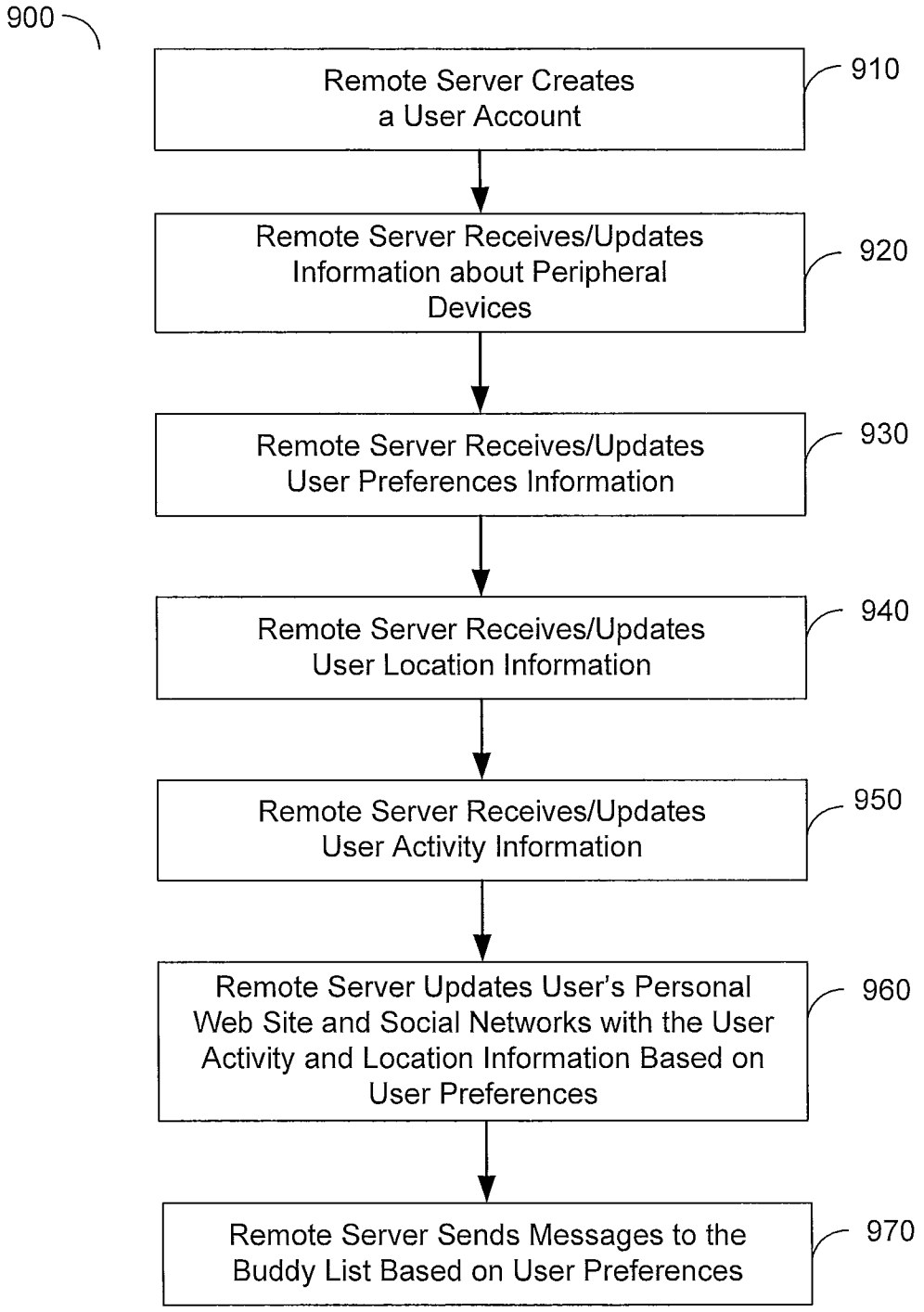

900
Remote Server Creates a User Account
910
Remote Server Receives/Updates Information about Peripheral Devices
920
Remote Server Receives/Updates User Preferences Information
930
Remote Server Receives/Updates User Location Information
940
Remote Server Receives/Updates User Activity Information
950
Remote Server Updates User's Personal Web Site and Social Networks with the User Activity and Location Information Based on User Preferences
960
Remote Server Sends Messages to the Buddy List Based on User Preferences
970

FIG. 9

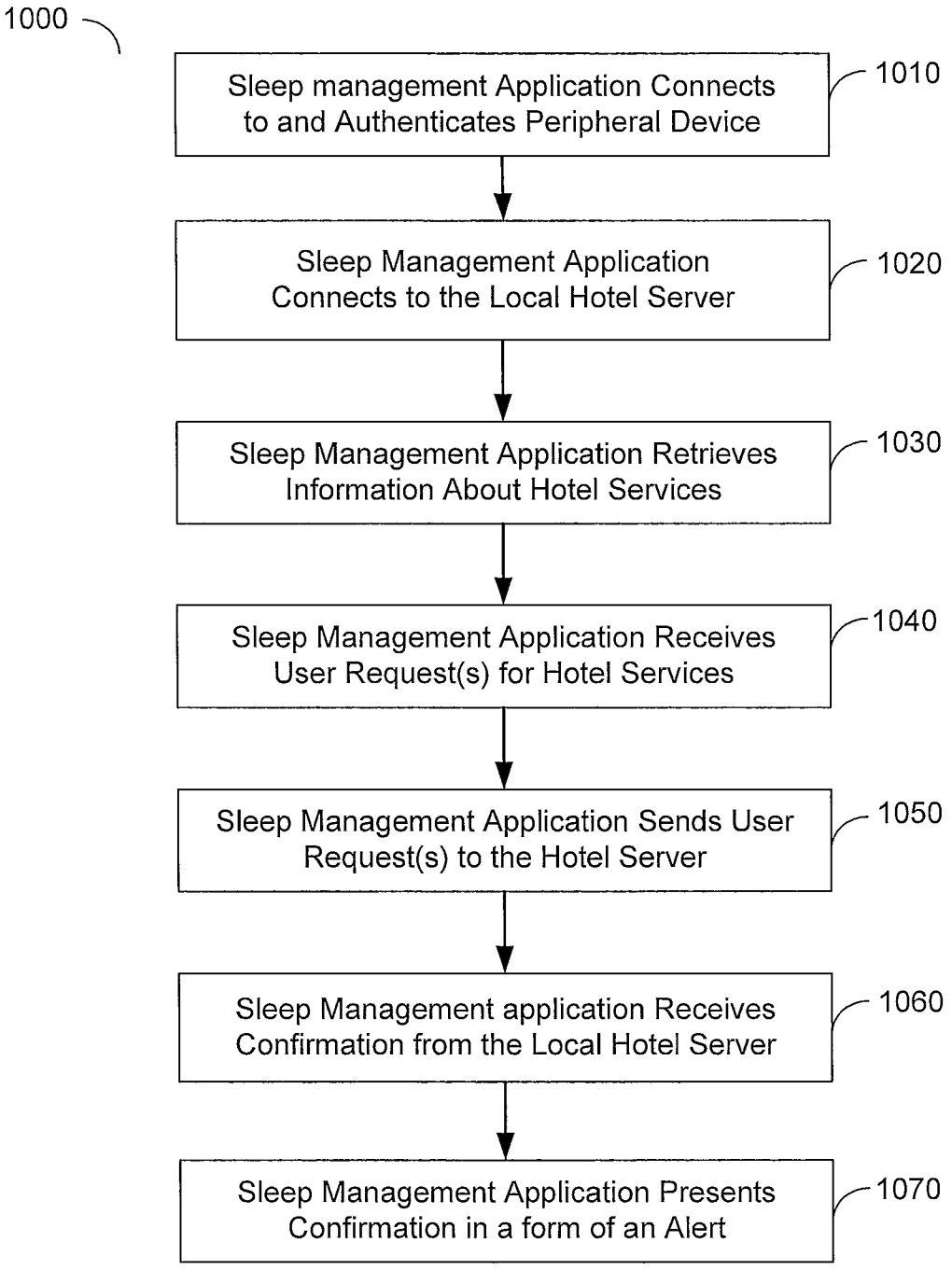

1000
Sleep management Application Connects to and Authenticates Peripheral Device
1010
Sleep Management Application Connects to the Local Hotel Server
1020
Sleep Management Application Retrieves Information About Hotel Services
1030
Sleep Management Application Receives User Request(s) for Hotel Services
1040
Sleep Management Application Sends User Request(s) to the Hotel Server
1050
Sleep Management application Receives Confirmation from the Local Hotel Server
1060
Sleep Management Application Presents Confirmation in a form of an Alert
1070

FIG. 10

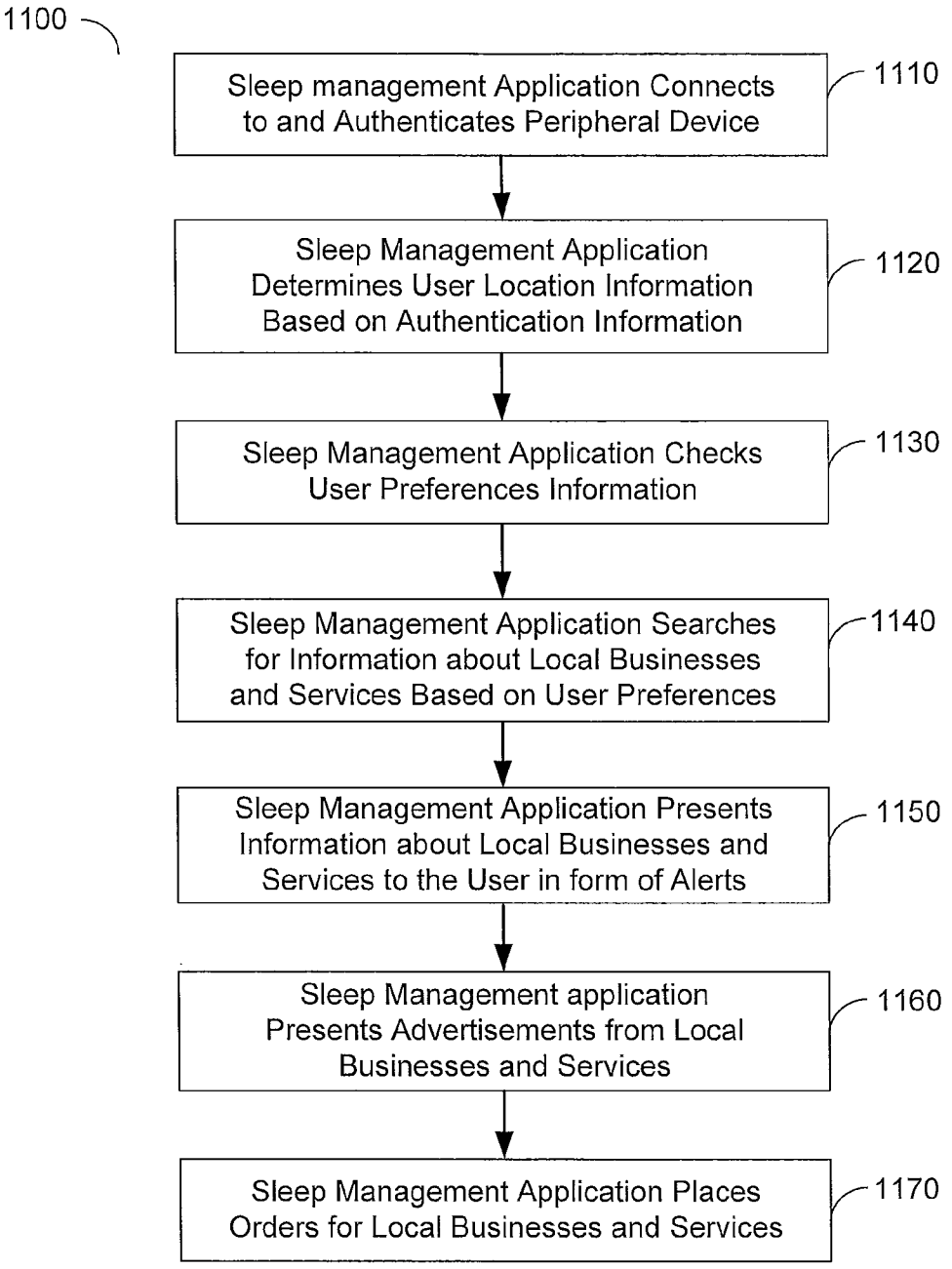

1100
Sleep management Application Connects to and Authenticates Peripheral Device
1110
Sleep Management Application Determines User Location Information Based on Authentication Information
1120
Sleep Management Application Checks User Preferences Information
1130
Sleep Management Application Searches for Information about Local Businesses and Services Based on User Preferences
1140
Sleep Management Application Presents Information about Local Businesses and Services to the User in form of Alerts
1150
Sleep Management application Presents Advertisements from Local Businesses and Services
1160
Sleep Management Application Places Orders for Local Businesses and Services
1170

FIG. 11

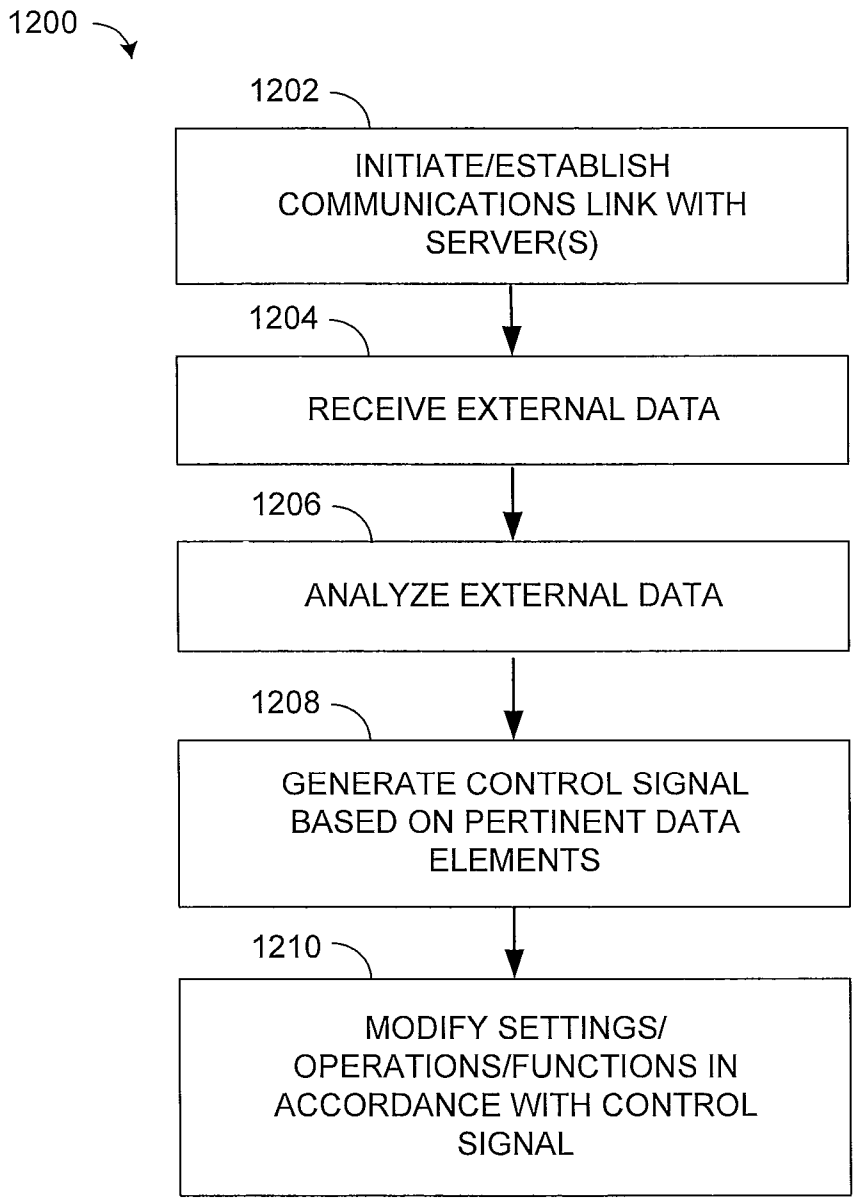

1200
1202
INITIATE/ESTABLISH COMMUNICATIONS LINK WITH SERVER(S)
1204
RECEIVE EXTERNAL DATA
1206
ANALYZE EXTERNAL DATA
1208
GENERATE CONTROL SIGNAL BASED ON PERTINENT DATA ELEMENTS
1210
MODIFY SETTINGS/ OPERATIONS/FUNCTIONS IN ACCORDANCE WITH CONTROL SIGNAL

FIG. 12

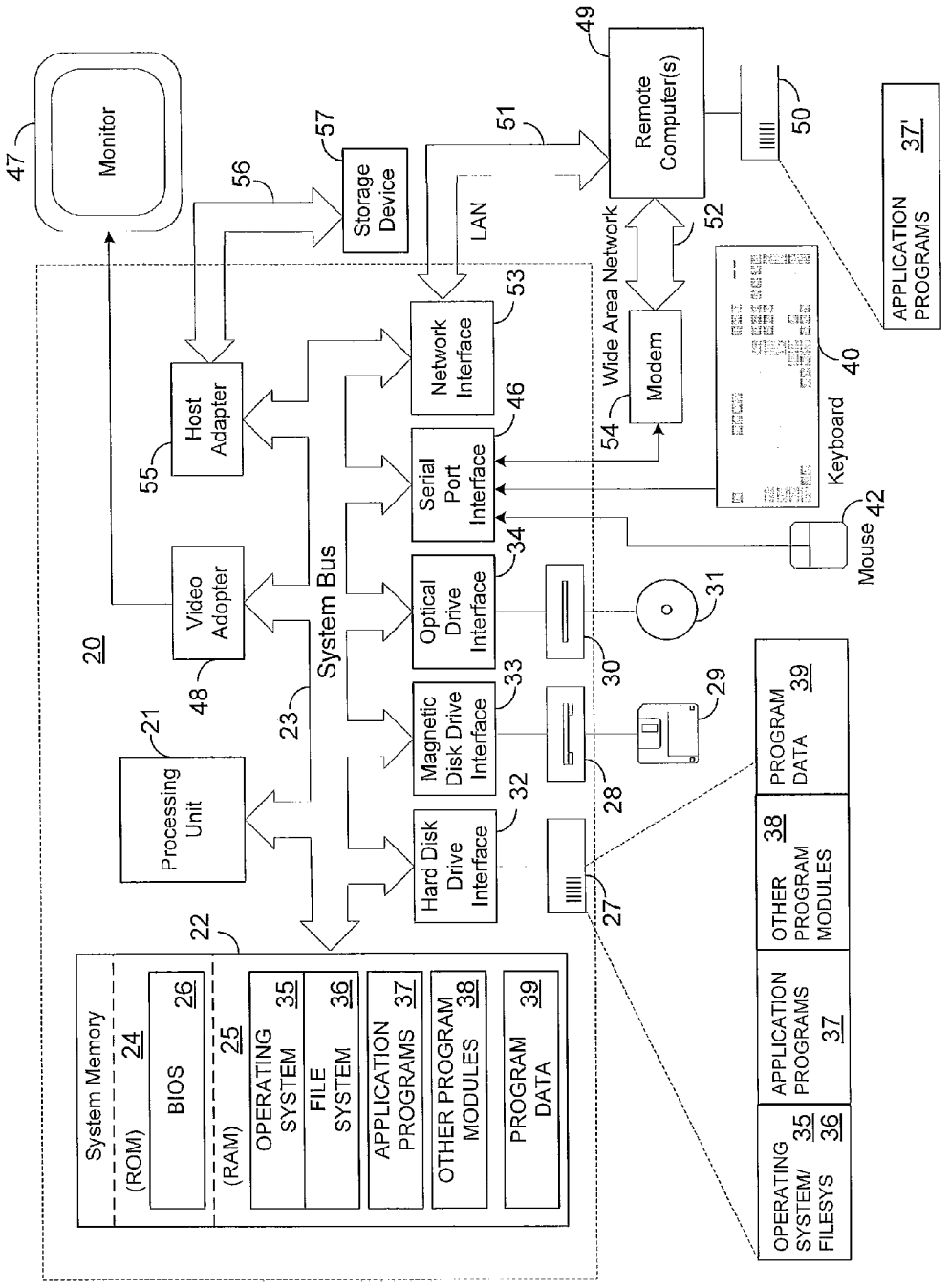

Monitor
47
Storage Device
57
56
LAN
51
Remote Computer(s)
49
50
APPLICATION PROGRAMS
37'
Host Adapter
55
Network Interface
53
Wide Area Network
52
Modem
54
Serial Port Interface
46
Keyboard
40
Mouse
42
Video Adopter
48
Optical Drive Interface
34
31
System Bus
20
Magnetic Disk Drive Interface
33
30
29
Processing Unit
21
23
Hard Disk Drive Interface
32
28
27
22
System Memory
(ROM) 24
BIOS 26
(RAM) 25
OPERATING SYSTEM 35
FILE SYSTEM 36
APPLICATION PROGRAMS 37
OTHER PROGRAM MODULES 38
PROGRAM DATA 39
OPERATING SYSTEM/ FILESYS 35 36
APPLICATION PROGRAMS 37
OTHER PROGRAM MODULES 38
PROGRAM DATA 39

FIG. 13

SYSTEMS AND METHODS FOR SLEEP MANAGEMENT

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application claims the benefit of U.S. patent application Ser. No. 61/292,103, filed Jan. 4, 2010, which is hereby incorporated by reference in its entirety.

TECHNICAL FIELD OF THE INVENTION

This disclosure relates generally to the field of consumer electronic devices and, in particular, to systems and methods in support of enhanced consumer electronic devices for sleep management.

BACKGROUND OF THE INVENTION

Alarm clocks have traditionally been used as a primary means for sleep management. These devices usually provide limited alarm settings options including what sounds are played when the alarm is triggered. In traditional alarm clocks, sound options are usually limited to an alarm, a radio or an audio CD. The user typically has the ability to manually preselect which type of sound is played, and sometimes has the option of first playing one type of sound, then playing another type of sound after a predetermined time period. The user can also preselect the radio station or CD that is to be played. In the case of a radio station, the user may preselect a radio station that plays a certain type of audio content, such as a light jazz radio station or the like. However, the recent proliferation of consumer electronic and computing devices having various software applications and extensive interoperability has significantly expanded user's sleep management options. For example, a consumer electronic device may be configured to function as an alarm clock. The device may also be connected to the traditional alarm clock and be used by the user to configure alarm settings and to select audio content to be reproduced on the alarm clock.

In addition, various consumer electronic and computing devices have frequent, if not constant network connectivity. These devices are capable of receiving a vast amount of information from remote data servers through the Internet. For example, it is common for users of capable devices to receive traffic and/or weather updates for a specific location. In many instances, various elements within this received information result in additional considerations for a user. For instance, if a weather forecast predicts inclement weather, and/or a traffic report indicates delays on a certain road, a user may wish to account for these current/future events by waking up at a time other than that which he/she is otherwise accustomed. However, there is presently no system or method that enables such accounting and/or considerations to be effectively implemented.

It is with respect to these considerations and others that the disclosure made herein is presented.

SUMMARY OF THE INVENTION

Technologies are presented herein for a system and method for enhancing a sleep management application.

In accordance with a broad aspect of the invention, a computing device executes code that implements a sleep management application which can, in certain implementations, provide control over a peripheral device, and, more particularly, control that executes either a user's settings or settings that

are received dynamically from an external source that may transform or otherwise alter the user's or the device's settings. As such, changes in local weather or traffic can influence the settings in the peripheral device, and so can changes based on other information received from a remote source, all according to the operation of the sleep management application. As a result, for example, an alarm function of a peripheral device or the computing device itself can be adjusted even while the user sleeps to account for such changes.

According to one aspect, the sleep management application cooperates with a computing device having a processor and a storage medium. The sleep management application utilizes one or more software modules that are stored on the storage medium and executed in the processor. The sleep management application operates by establishing a communications link with a server that maintains data pertaining to the computing device or to a user. The sleep management application retrieves data from the remote server and generates a custom/tailored interface based on the data in order to configure a feature of the computing device. Then, the sleep management application is programmed with a sleep management setting using the custom/tailored interface to implement the feature so-configured.

According to another aspect, a computer implemented method for enhancing a sleep management application operating on a computing device and having an alarm function is provided. The computing device has a processor and a storage medium, and the sleep management application has one or more software modules stored on the storage medium and executed in the processor. A communications link between the sleep management application and a remote server is initiated, the remote server having external data pertaining to the computing device or to a user. The sleep management application receives the external data from the remote server and analyzes the external data to identify elements that pertain to the sleep management application. Then, the sleep management application generates a control signal based on the identified elements and modifies a setting governing an operation of the alarm function of the computing device in accordance with the control signal.

According to yet another aspect, a computer implemented method for enhancing a sleep management application operating on a computing device is provided. The computing device has a processor and a storage medium, and the sleep management application has one or more software modules stored on the storage medium and executed upon the processor to cooperate therewith and implement enhanced sleep-management functionality. The sleep management application collects data that is perceptible to, or usable by, the computing device and analyzes the data to identify elements that pertain to the sleep management application. The sleep management application then generates a control signal based on the identified elements and modifies the operation of the sleep management application in accordance with the control signal.

According to yet another aspect, a sleep management system is provided including a processor, a storage medium accessible by the processor, and one or more software modules encoded on the storage medium which execute in the processor and which, when executed by the processor, cause the sleep management system to initiate a communications link with a remote server, the remote server having external data pertaining to a computing device or to a user. The software modules, in cooperation with the processor, further cause the sleep management system to receive the external data from the remote server and analyze the external data to identify elements that pertain to the sleep management appli-

cation. Then, the software modules cause the sleep management system to generate a control signal based on the identified elements and modify a setting governing an operation of an alarm function in accordance with the control signal.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates a schematic block diagram of a sleep management system in accordance with one example embodiment;

FIG. **2** illustrates a schematic block diagram of a peripheral device, such as an alarm clock, in accordance with one example embodiment;

FIGS. **3-4** illustrate schematic block diagrams of databases maintained by the sleep management system in accordance with one example embodiment;

FIGS. **5-12** illustrate flow diagrams of the methods of operation of the sleep management system in accordance with one example embodiment; and

FIG. **13** illustrates a schematic block diagram of a computer system in accordance with one example embodiment.

DETAILED DESCRIPTION OF CERTAIN EMBODIMENTS OF THE INVENTION

Example embodiments are described herein in the context of systems, methods and computer program products for sleep management. Those of ordinary skill in the art will realize that the following description is illustrative only and is not intended to be in any way limiting. Other embodiments will readily suggest themselves to such skilled persons having the benefit of this disclosure. Reference will now be made in detail to implementations of the example embodiments as illustrated in the accompanying drawings.

FIG. **1** illustrates a schematic block diagram of a sleep management system **100** in accordance with one example embodiment. The system **100** includes one or more peripheral devices **105**, such as an audio reproduction device (for example, an alarm-clock radio or a similar device having audio reproduction functionality such as a speaker as one example of an output device for providing an alert to a user as part of the alarm function). The system **100** further includes a computing device such as a consumer electronic device **120** (for example, a smart phone, portable audio/video player, personal digital assistant (PDA), digital reader, or any other type of electronic device having data processing/storage capabilities), and/or a personal computer **130** (for example, a desktop, laptop, tablet, or notebook computer). Device **120** and PC **130** may be connected to the peripheral device **105** via dedicated analog/digital connectors **125** and **135**, respectively, and/or via a wired or wireless, network **110**, such as Ethernet, 802.11b/g/n, and Bluetooth. In one example, the consumer electronic device **120** may be docked with the peripheral device **105**, in which case the connector **125** may be a generic or custom docking connector having digital and/or analog input/output ports. In one example embodiment, the connector **125** may be a Universal Serial Bus (USB) connector or other types of serial data connectors. In one example embodiment, the connector **125** may include a cable. The personal computer **130** may be connected to the peripheral device **105** via the connector **135**, which may also be a USB connector or other types of serial or parallel data connectors.

The system **100** further includes a sleep management application **115**, which may reside on the consumer electronic device **120** and/or on the personal computer **130**. In general, the sleep management application **115** includes one or more software modules that provide configuration and storage of various sleep management settings for the peripheral device **105**, including but not limited to clock settings, alarm settings, radio settings, audio settings, network settings, user profile settings and various other configuration parameters and settings. The sleep management application **115** may be provided by the manufacturer of the peripheral device **105**, the manufacturer of the computing device **120**, **130**, or a third party. In one example embodiment, the sleep management application **115** may be written and distributed by the manufacturer of the peripheral device **105**, such as the manufacturer of an alarm clock radio. In another example, the manufacturer of the audio reproduction device **105** may provide Application Programming Interfaces (APIs) to the peripheral devices **105** so that third-party software developers can create their own sleep management applications **115** using the provided APIs. The application **115** may be executed by the operating system (OS) or the Internet browser of the consumer electronic device **120** and/or personal computer **130**. The sleep management application **115** may be written using C, C++, Perl, Java, Visual Basic, XML, HTML and other known programming languages.

The system **100** may further include various local and remote servers **140**, **170**, **190** that operate in conjunction with the sleep management application **115** to provide various information and services to the sleep management application **115**, consumer electronic device **120**, personal computer **130**, peripheral device **105**, and/or application users. In one example embodiment, the system **100** may include a remote server **140** hosted by the manufacturer of the peripheral device **105** or a third party. In one embodiment, server **140** may maintain and provide to the sleep management application **115** information about various peripheral devices **105**, which may be stored in a database **150**, and serve as a backup for the user account information, which may be stored in a database **160**. In another example embodiment, the peripheral device **105** may be located in a hotel, in which case, the system **100** may include a local hotel server **170** and hotel database **180**. The sleep management application **115** may communicate with the hotel server **170** via network **110** to provide and/or receive information about various hotel services. In yet another example embodiment, the system **100** may include various social networking and/or messaging servers **190**. The sleep management application **115** may provide and/or receive status update notifications about activities of the application user or other users to/from the social networking servers **190**, such as Twitter® or Facebook®, or send email or instant messages with the user activity information using messaging servers **190**. Operation of these and other servers will be described in greater detail herein below.

In an alternate arrangement, sleep management application **115** can be configured to receive information from one or more servers **140**, **170**, **190**, and to further utilize the received information to enhance and/or modify the operation of the sleep management application **114** including an alarm function. By way of example, sleep management application **115** can utilize the computing device's **120**, **130** existing Internet connection to initiate a connection between the sleep management application **115** and one or more local or remote servers **140**, **170**, **190**. The sleep management application **115** can then receive external data (i.e., data that is present on the server **140**, **170**, **190** but not on the computing device **120**, **130**) from the server(s) **140**, **170**, **190**. Preferably, the data received from the server(s) pertains to the computing device **120**, **130** (such as data relating to the computing device's **120**, **130** location), the user (such as personal scheduling informa-

tion and/or personal favorites/interests), and/or the sleep management application **115**, though in principle the sleep management application **115** can receive any form of data. By way of example, in one arrangement the sleep management application **115** receives traffic and/or weather data from one or more traffic/weather related websites/servers. This data can then be used to generate control signals that configure and control various settings and functions of the sleep management application **115** in a manner that transforms or changes user/device settings (i.e., existing values that are set in the device) that may have been input manually by the user through the sleep management application interface, the computing device **120**, **130**, and/or the audio reproduction device **105**, as will be described in greater detail below. Additionally, the data can be received in response to a specific query by the sleep management application **115** and/or the computing device **120**, **130** (such as a query regarding current traffic conditions in a specific area) and/or in response to a standing query (such as weather in the user's hometown).

It should be noted that while the foregoing description of an arrangement of sleep management system **100** incorporates numerous components, in other arrangements fewer or additional components can be present. Thus, for example, in one particular arrangement, a computing device **120**, **130** can communicate with and receive data from various external servers **140**, **170**, **190** through network **110**, free of communication with or reliance upon the peripheral device **105**. In such an arrangement, a speaker on-board the device **120**, **130** can be the output device that provides an alert to the user as the alarm function.

FIG. **2** illustrates a schematic block diagram of the peripheral device **105** in accordance with one example embodiment. The device **200** may be a digital alarm clock or other such device having additional functionality such as audio reproduction. The device **200** may include a microcontroller **205**, such as a simple 8-bit microcontroller or a more complex ARM-based microprocessor, for controlling operation of the device **200** and a memory **210**, such as read-only memory (ROM) or random access memory (RAM), for storing program instructions and user settings for operating the device **200**. The device **200** may also include an internal power amplifier **215** and speaker **220** for reproducing audio sounds. The device **200** may also include a display **225**, such as an LCD display, for displaying time/date and other information and a control panel **230**, which may include a plurality of programmable buttons for controlling operation of the audio reproduction device **200**. In one example, the display **225** may be a touchscreen display and the control panel **230** may at least in part include a graphical user interface (GUI). The device **200** may also include one or more radio tuners **235**, such as AM, FM, or satellite radio tuners. The device **200** may also include a plurality of digital/analog data connectors, such as infrared (IR) receiver **240** for receiving commands from a remote control **280**, a docking connector **245** for docking the consumer electronic device **120** (in either a wired or wireless manner), an analog I/O connector **250** for connecting to the external speakers or a microphone, a digital I/O connector **255**, such as a USB connector, for connecting to the personal computer **130** and/or the consumer electronic device **120**, and a network connector **260**, such as wired or wireless local area network (LAN) card or a Bluetooth® card. The device **200** may also include a remote control **280**, which may communicate using RF or IR signals, to control various functions of the device **200** and/or functions of the sleep management application **115** residing on the consumer electronic device **120** and/or the personal computer **130**. The device **200** may also include a CD player (not shown) or other internal audio source devices.

As indicated above, the sleep management application **115** enables configuration of various sleep management settings and functions (such as clock settings, alarm settings and functions, radio settings, audio settings, network settings, user profile settings and various other configuration parameters and settings) and storage of configuration settings for various peripheral devices **105** and computing devices **120**, **130**. To that end, the sleep management application **115** maintains a user account database that contains one or more accounts for various users of the application **115** that contain information pertaining to the user, the computing device **120**, **130**, the sleep management application **115**, and/or the peripheral device **105**. FIG. **3**A illustrates one example embodiment of a user account database **300** containing user accounts **310**. Each account **310** may include user identifying information **320** including a user's name as well as application login name and password. The account **310** may also include user preferences **330**, including e-mail address, personal web site, social network information such as login name and password, user preferences with respect to alerts and advertisements, as well as a user's buddy list. The user account **310** may also include user activity information **340** including current location, current activity, such as sleeping, awake, listening to radio, etc., and planned activity, such as waking up at 7:30 AM, etc., for example. As will be described in greater detail below, the sleep management application **115** can analyze user activity information **340** in order to generate one or more control signals that can modify the operation of the computing device **120**, **130**, the sleep management application **115**, and/or the peripheral device **105**. The account **310** may also include user personal data **350** including audio/video files that may be reproduced on the peripheral device **105** or on the computing device itself. The account **310** may also include one or more user sleep profiles **360**, which include data structures containing specific sleep management scenarios for various computing devices **120**, **130** and/or peripheral devices **105**. User sleep profiles **360** will be discussed in greater detail herein below. The account **310** may also include application version information **370** and information **380** about computing devices **120**, **130** and/or peripheral devices **105** with which the sleep management application **115** is configured to operate.

As noted above, sleep profiles **360** contain specific sleep management scenarios for various computing devices **120**, **130** and/or peripheral devices **105**. These sleep profiles **360** can also be analyzed by the sleep management application **115** in order to generate one or more control signals that can modify the operation of the computing device **120**, **130**, the sleep management application **115**, and/or the peripheral device **105**, as will be described in greater detail below. In one example, a user may create sleep profiles for different days of the week; thus, for example, a weekday may have one sleep profile and a weekend may have a different sleep profile. In addition, the user may create different sleep profiles for different locations; thus, for example, the user may have one sleep profile at home and a different sleep profile when traveling on business. Moreover, sleep profiles **360** may differ based on the functionality of the computing devices **120**, **130** and/or the peripheral device **105** with which the sleep management application **115** is operating. For example, if device **105** has a radio tuner, a sleep profile may indicate radio stations to which the device **105** must tune to. If the device **105** does not have a radio tuner, the sleep profile would indicate another audio source, such as a CD track, MP3 file or

a network address, to be used by the device **105**. By way of further example, if device **105** has video display means (such as an LCD screen) a sleep profile can indicate (i.e., identify) images or videos to be displayed by the device. The sleep profiles **360** can be easily created and stored by the user on the application **115**. When the consumer electronic device **120** or personal computer **130** on which the application **115** runs is connected to the peripheral device **105**, the user may launch the sleep management application **115** and select a sleep profile **360** to be executed by the application. Alternatively, the application **115** may automatically select and execute a profile that suits user preferences. In like manner, by way of example, the sleep profiles can indicate how the computing devices **120**, **130** are to respond in the absence of a connection with a peripheral device **105**.

FIG. **3**B illustrates one example embodiment of a user sleep profile **360** for a specific sleep management scenario. The profile **360** may include wake up options **365** including but not limited to the alarm time, alarm duration, alarm sound, such as volume, the source of sound, such as a preset radio station, a CD track or a MP3 file from the user's personal data **350** and snooze options, such as enable/disable snooze button on the audio reproduction device **105**. The wake up options **365** may also include a list of actions to be taken by the sleep management application **115** when the alarm is activated. For example, the actions may include updating the user's Facebook page and sending an instant message to the user's buddy list indicating that the user is awake and listening to a certain radio station. The sleep profile **360** may also include bedtime options **375** including the time when user is going to bed, the sound to be activated when the user is going to bed, the sound source and duration as well as the list of actions to be taken when the user is going to bed. The sleep profile **360** may also include various miscellaneous options **385** including various miscellaneous alarm settings and action listings.

In one example embodiment, the user account database **300** or a back up thereof may be stored on the remote server **140** in a database **160**. In addition, the remote server **140** may include a database of peripheral devices **105** and/or computing devices **120**, **130**. FIG. **4** illustrates one example embodiment of the peripheral device database **400**. The database **400** includes records **410** for each manufactured peripheral device **105** and/or computing device **120**, **130**. A record **410** includes device model identifier **420**, device configuration data **430**, device user manual **450** in electronic format, device software update information **460**, and various APIs **470** that allow sleep management applications **115** to communicate with the peripheral devices **105** and/or the computing devices **120**, **130**. The sleep management application **115** may request device-specific information from the database **400** in order to communicate with various peripheral devices **105** and/or computing devices **120**, **130**. In one example embodiment, a part of the information of the database **400** may be maintained by the sleep management application **115**.

FIG. **5** illustrates an example methodology **500** for activation of a sleep management application **115** on a consumer electronic device **120** or a personal computer **130**. At step **510**, a user may download the application **115** onto the consumer electronic device **120** or the personal computer **130**. At step **520**, the user may install the sleep management application **115** on the consumer electronic device **120** or the personal computer **130**. At step **530**, the sleep management application creates one or more user accounts **310** for application users. At this point, the user may provide user identifying information and select a login name and password. At step **540**, the application **115** collects/updates user preferences, personal data and user activity information, and stores this information in a user account **310**. At step **550**, the application may collect/update information about the consumer electronic device **120** or the personal computer **130** on which it is executed, such as device model identifier and the like, and store this information in the user account **310**. This information may be used to search for device- or computer-specific application updates and/or other device- or computer-specific functions. At step **560**, the user may create various sleep profiles **360** using predefined sleep profile templates. The templates may include predefined data entry fields for entry of the necessary information. Notably, the templates may be device-specific. For example, the application may use the model number identifier of the peripheral device **105** and/or the computing devices **120**, **130** to determine functionality of the device, such as a radio tuner, CD player, etc., and provide sleep profile templates that reflect features of the peripheral device **105** and/or the computing devices **120**, **130**. At step **570**, the sleep management application **115** may connect to the remote server **140** through the network **110** and, at step **580**, send all collected user account information to the remote server **140** for back up on the user account database **160**.

FIG. **6** illustrates an example methodology **600** for configuring a peripheral device **105** using sleep management application **115**. At step **610**, the consumer electronic device **120** or personal computer **130** is docked or connected (wired or wirelessly) to the peripheral device **105**. At step **620**, the sleep management application **115** auto starts or is manually launched by the user. At step **630**, the sleep management application **115** and the consumer electronic device **120** authenticate each other by exchanging, for example, one or more device model identifier(s) and/or software version identifier(s). At step **640**, the sleep management application may connect to the remote server **140** and retrieve, at step **650**, configuration information about the peripheral device **105** from the remote server **140**. Alternatively, this device configuration information may be already known to the application **115** and it does not need to retrieve it from the remote server **140**. At step **660**, the sleep management application **115** generates, based on the device configuration information, a custom user interface for configuring specific features of peripheral device **105**. For example, the user interface displays only control buttons available on the specific peripheral device to which the sleep management application **115** is currently communicating. At step **670**, the sleep management application **115** also retrieves from the local or remote user account database a user's personal data and sleep profiles. At step **670**, the user may configure operation of the peripheral device using the custom interface. For example, the user may program preset buttons of the audio reproduction device to play specific audio files stored on the consumer electronic device **120** or personal computer **130** on which the sleep management application **115** runs or to stream Internet radio from network addresses specified in the user preferences fields of the user account **310**. In addition, using the custom interface of the sleep management application **115**, the user may select one of the sleep profiles associated with the peripheral device **105** to be executed by the sleep management application **115**.

FIG. **7** illustrates an example methodology **700** for collection and distribution of user information by the sleep management application **115**. At step **710**, the sleep management application **115** connects to and authenticates the peripheral device **105**. In an alternate arrangement, the sleep management application executes on a computing device **120**, **130** without connecting to a peripheral device **105**. At step **720**, the application **115** determines user location based on the device authentication information. For example, the applica-

tion **115** may compare the current device model identifier with the "home device" model identifier stored in the user account **310**. If these identifiers are different, the application **115** may request that remote server **140**, which has information about all manufactured peripheral devices, determine where the current peripheral device is located. In an alternate arrangement, wherein the sleep management application **115** executes on a computing device **120**, **130** without connecting to a peripheral device **105**, user location is determined using other location determining methods. By way of example, the sleep management application **115** may approximate the location of the computing device **120**, **130** by requesting the location information associated with the computing device's **120**, **130** assigned IP address. By way of further example, if the computing device **120**, **130** is equipped with a GPS receiver, the sleep management application **115** may utilize the receiver to determine the device's location. By way of yet further example, if the computing device **120**, **130** is equipped with the capacity for cellular communication, the sleep management application **115** may utilize triangulation or other such location determining techniques in order to determine the device's **120**, **130** location. All of the foregoing can be accomplished, in one embodiment of the invention, by execution of code or a portion of code that comprises the sleep management application. At step **730**, the application **115** checks user preferences in the user account **310** and, based on user preferences, may send user location update notifications to various messaging or social network servers **190**. At step **740**, the sleep management application **115** collects user activity information from the configuration settings of the peripheral device **105** and/or the computing device **120**, **130**. For example, the user may program an alarm setting of the peripheral device **105** (such as an audio reproduction device) and/or the computing device **120**, **130** to allow the alarm to go off at 8:30 PM and to begin streaming a broadcast of football game from an Internet radio station. At step **750**, the application **115** checks user preferences in the user account **310** and, based on user preferences, may send user activity update notifications to various messaging or social network servers **190**. At step **760**, the application **115** may detect that the user activated one of the control buttons of the peripheral device **105**, such as a radio preset button of an audio reproduction device such as an alarm clock radio that tunes FM tuner to frequency 103.5 MHz. In response, the application **115** may check, at step **770**, user preferences in the user account **310** and, based on user preferences, may send user activity update notifications to various messaging or social network servers **190**. For example, if the detected user action took place at 9 PM, the message may indicate that the user stopped listening to the broadcast of the football game and instead is listening to music on New York dance music station 103.5 KTU, for example.

FIG. **8** illustrates an example methodology **800** for displaying user activity information by the sleep management application **115**. At step **810**, the application **115** connects to the remote server **140** and, at step **820**, retrieves user activity information that was collected by the application for a period of time. At step **830**, the sleep management application **115** analyzes the user activity data using various statistical and/or probabilistic models known in the art. At step **840**, the sleep management application **115** may present user activity information in a graphical or statistical form. For example, the application **115** may generate a graph of the user's average sleep time per day for the past month versus a recommended amount of sleep or versus the amount of sleep of users of similar demographics or similar locale. In another example, the application may show what radio stations the user had listen to most during the course of a year, compare popularity rating of these radio stations, and suggest other similar radio stations. At step **850**, the sleep management application **115** may reorganize the user activity information in different format or other criteria. For example, the information may be presented in a form of a pie or bar chart or in tabular form. At step **860**, the user may request additional activity information to be retrieved and presented. For example, user activity information for a shorter or longer period of time may be requested by the user. As another example, certain information that has been gathered from other users (e.g., "buddies" of the user on a given social network) can be presented to the user. In this regard, the sleep management application **115** can retrieve information concerning the song, radio station, or other program that a buddy has selected as a wake up alarm and cause that selection to be used at the computing device **120**, **130** or peripheral device **105**. At step **870**, the user may instruct the sleep management application **115** to send a portion of the user activity information to a particular email address or be posted on the user's social network web page, such as a Facebook or the like.

FIG. **9** illustrates an example methodology **900** for operation of the remote server **140** of the sleep management system **100**. At step **910**, the sleep management application **115** may request the remote server **140** to create a user account **310** in the database **160** for each new user of the system **100**. At step **920**, the remote server **140** receives and updates information about various peripheral devices **105** and stores this information in the database **150**. At step **930**, the remote server **140** receives **115** user preferences information from the sleep management application and updates this information in the user account **310**. At step **940**, the remote server **140** receives user location information from the sleep management application **115** and updates this information in the user account **310**. At step **950**, the remote server **140** receives user activity information from the sleep management application **115** and updates this information in the user account **310**. At step **960**, the remote server **140** may be configured to update, based on user preferences, the user's personal web site and/or social network web sites with the user activity information. At step **970**, the remote server **140** may be further configured to send, based on user preferences, e-mail or instant messages to individuals on the user's buddy list.

FIG. **10** illustrates an example methodology **1000** for operation of the sleep management application **115** in a hotel environment. Peripheral devices **105**, such as alarm clocks and the like, can be often found in hotel rooms. The sleep management application **115** may be configured to operate with such peripheral devices **105** and with other hotel systems to provide hotel guests and application **115** users with advanced service options. At step **1010**, when a consumer electronic device **120** or a personal computer **130** are connected to the peripheral device **105** located in a hotel room, the sleep management application **115** connects to and authenticates the peripheral device **105**. At step **1020**, the sleep management application **115** may then connect to the local hotel server **170** through the peripheral device **105**. At step **1030**, the sleep management application **115** may retrieve information about services provided by the hotel from the local hotel server **170**. At step **1040**, the application **115** receives user requests for specific hotel services, such as ordering in-room meals or other hotel services, and, at step **1050**, forwards these requests to the hotel server **170**. At step **1060**, the application **115** may receive service request confirmation messages from the hotel server **170**, and, at step **1070**, present such confirmations in form of audio/visual alerts.

FIG. **11** illustrates an example methodology **1100** for collecting and utilizing user location information by the sleep management application **115**. At step **1110**, the application **115** connects to and authenticates the peripheral device **105**. At step **1120**, the application **115** determines user location based on the device authentication information. For example, the application **115** may compare the current device model identifier with the "home device" model identifier stored in the user account **310**. If these identifiers are different, the application **115** may request that remote server **140**, which has information about all manufactured peripheral devices, determine where the current peripheral device is located. At step **1130**, the sleep management application **115** may check user preferences in the user account **310** and, at step **1140**, search on the Internet for information about local businesses and services. At step **1140**, the sleep management application **115** presents information about local businesses and services to the user as well as advertisement and promotional data. At step **1150**, the user may place orders for local businesses and services thorough the application **115**.

The sleep management application **115** also includes software modules that enable the application to adjust or modify one or more settings and/or configurations associated with the computing device **120**, **130**, the peripheral device **105**, and/or the sleep management application, as illustrated in FIG. **12**. In one exemplary arrangement **1200**, at step **1202** the sleep management application **115** initiates and establishes a communications link with one or more server(s) **140**, **170**, **190**. Preferably, the server(s) **140**, **170**, **190** maintain data pertaining to the computing device **120**, **130**, a peripheral device **105**, and/or the user/user account. At step **1204** the sleep management application then receives external data (that is, data that is presently external to the sleep management application **115** and/or the computing device **120**, **130**) from the server(s) **140**, **170**, **190**. In doing so, the sleep management application **115** and/or the computing device **120**, **130** can transmit a specific query (such as a query regarding current traffic conditions in a specific area) and/or a standing query (such as weather in the user's hometown) to one or more of the server(s) **140**, **170**, **190**. By way of example, based on the user account, the sleep management application **115** can identify the computing device's (**120**, **130**) present location (obtained via GPS, etc., as referenced above) as well as the user's place of employment. As such, the sleep management application **115** can retrieve external data pertaining to these locations, such as traffic and/or weather conditions in the user's home and/or work location. In an alternate arrangement, the server(s) may 'push' pertinent external data to the sleep management application **115** and/or the computing device **120**, **130**, without a prior query. In either case, data is being provided from a remote source to influence the operation of the sleep management application and the computing device with which it cooperates, and this arrangement results in the modification of the application's configuration, at least within any limits established by the user, as described below.

Upon receiving the external data, the sleep management application **115** proceeds to analyze the external data at step **1206** in order to identify elements that pertain to the sleep management application **115**, the computing device **120**, **130**, and/or the user/user profile. In doing so, the sleep management application **115** uses one or more software modules to parse and/or analyze the received external data to further identify elements of the external data that pertain to the computing device **120**, **130**, the sleep management application **115** and/or to the user/user account. By way of example, the sleep management application **115** can further analyze received local traffic/weather information to determine whether traffic and/or weather conditions may affect a user's commute or trip. Such determinations are made in regard to the received local traffic/weather information and optionally in regard to stored data concerning the travel patterns of the user, say, on a weekday morning.

At step **1208** the sleep management application **115** then generates a control signal based upon the pertinent data elements. The control signal is preferably a set of one or more instructions and/or parameters that direct the operation of the computing device **120**, **130**, the peripheral device **105**, and/or the sleep management application **115**. By way of example, based upon an identified data element that indicates that traffic and/or weather problems are occurring (or are projected to occur) that will add 25 minutes to a user's daily commute, a control signal can be generated that modifies the alarm settings of the sleep management application **115** to sound an alarm 25 minutes earlier than it was originally set for. As such, the data received from a remote server can dynamically transform or otherwise alter the user's or the device's settings, regardless of whether the user is sleeping or not present to change any settings.

Once the control signal has been generated, at step **1210** the sleep management application **115** can modify one or more settings associated with the operation of the computing device **120**, **130**, the peripheral device **105**, and/or the sleep management application **115** in accordance with the control signal. In doing so, the sleep management application **115** implements the control signal's instructions. By way of example, the sleep management application **115** can modify an existing setting that governs the operation of the sleep management application's **115** alarm function (i.e., the alarm is presently set to ring at 7:30 AM) by implementing the control signal (i.e., an instruction to sound the alarm 25 minutes earlier), thereby resulting in an alarm setting (i.e., 7:05 AM as opposed to 7:30 AM) which is tailored to the specific circumstances relevant to the user.

It should be noted that while in one arrangement the generated control signals are applied in an automated fashion (that is, they are applied without the need for user input and/or interaction), in other arrangements the user can be prompted to review and approve/deny the implementation of one or more control signals. By way of example, the sleep management application **115** can display to a user a proposed control signal (i.e., set alarm clock 25 minutes earlier). Alternatively, the sleep management application can provide the user with the underlying information that is used by the sleep management application **115** to derive the control signal (for example, the pertinent traffic/weather data) and enable the user to either approve or deny the implementation of the control signal. Alternatively, the user can edit the parameters of the control signal (for example, the user can modify the control signal to have the alarm sound 15 minutes earlier as opposed to the originally proposed 25 minutes, or within a limit such as no more than 15 minutes earlier than any previously set time). The user can further select which settings, functions, and/or operations can be modified by generated control signals without user prompting, and which settings, functions, and/or operations require user acceptance prior to implementation.

It should be further noted that while the foregoing examples have illustrated the operation of the sleep management application **115** with respect to modifying an alarm function, the sleep management application **115** can modify nearly any function, setting and/or operation pertaining to the computing device **120**, **130**, the peripheral device **105**, and/or the sleep management application **115**. By way of example, as described in detail above, using any of a variety of means

the sleep management application **115** can detect the location of the computing device **120**, **130**. Utilizing this information together with received external information (as described above), the sleep management application **115** can determine that the user is at a stadium during a sporting event. Accordingly, a control signal can be generated which increases the volume of the computing device's **120**, **130** ringer, thereby enabling the user to hear audible notifications despite noisy surroundings.

In addition, while the foregoing description has referred periodically to interaction and/or communications between the computing device **120**, **130** and/or the peripheral device **105** with one or more servers **140**, **170**, **190**, it should be noted that in other arrangements the sleep management application **115** and other aspects and features disclosed herein are fully operable without communication with and/or connection to such servers. In such embodiments, data and/or information that is received from and/or sent to the server(s) **140**, **170**, **190** can instead be obtained from/transmitted to internal and/or local memory/storage accessible by computing device **120**, **130** and/or peripheral device(s) **140**, **170**, **190**. Additionally, various elements referenced above, such as user activity information **340** and sleep profiles **360** can be analyzed and control signals can be generated based upon these items.

All of the functionalities described herein whether by modules or otherwise can be accomplished, in one embodiment of the invention, by execution of code or a portion of code that comprises the sleep management application.

FIG. **13** depicts an exemplary system **20** on which the sleep management application **115** may be executed. In one aspect, the system **20** may represent a personal computer **130** or the like. In another aspect, the system **20** may represent a consumer electronic device **120** or the like. In either aspect, the system **20** may include some of the components depicted in FIG. **12**. For example, the system **20** may include a processing unit **21**, a system memory **22**, and a system bus **23** that couples various system components including the system memory **22** to the processing unit **21**. The system bus **23** may be any of several types of bus structures including a memory bus or memory controller, a peripheral bus and a local bus using any of a variety of bus architectures. The system memory includes a read-only memory (ROM) **24** and random access memory (RAM) **25**. A basic input/output system **26** (BIOS), containing the basic routines that help to transfer information between the elements within the computer system **20**, such as during start-up, is stored in ROM **24**.

The system **20** may further include a hard disk drive **27** for reading from and writing to a hard disk, not shown, a magnetic disk drive **28** for reading from or writing to a removable magnetic disk **29**, and an optical disk drive **30** for reading from or writing to a removable optical disk **31** such as a CD-ROM, DVD-ROM or other optical media. The hard disk drive **27**, magnetic disk drive **28**, and optical disk drive **30** are connected to the system bus **23** by a hard disk drive interface **32**, a magnetic disk drive interface **33**, and an optical drive interface **34**, respectively. The drives and their associated computer-readable media provide non-volatile storage of computer readable instructions, data structures, program modules/subroutines, where each of the steps described above can be a separate module, or several steps can be aggregated into a single module, and other data for the system **20**. Although the exemplary environment described herein employs a hard disk, a removable magnetic disk **29** and a removable optical disk **31**, it should be appreciated by those skilled in the art that other types of computer readable media that can store data accessible by a computer, such as flash memory cards, digital video disks, RAMs, ROMs, EPROMs and the like may also be used in the exemplary operating environment.

A number of program modules may be stored on the hard disk, magnetic disk **29**, optical disk **31**, ROM **24** or RAM **25**, including an operating system **35**. The system **20** includes a file system **36** associated with or included within the operating system **35**, one or more application programs **37**, including the sleep management application **115**, other program modules **38** and program data **39**. A user may enter commands and information into the system **20** through input devices such as a keyboard **40** and pointing device **42**. Other input devices may include a microphone, joystick, touch pad/screen, satellite dish, scanner or the like. These and other input devices may be connected to the processing unit **21** through a serial port connector **46** coupled to the system bus, and can be connected by other means, such as a parallel port, game port or universal serial bus (USB). A monitor **47** or some other type of display device may be connected to the system bus **23** via a video adapter **48**. In addition to the monitor **47**, the system **20** may include other peripheral output devices (not shown), such as speakers and printers.

The system **20** may operate in a networked environment using wired or wireless connections **51** and **52** to one or more remote computers **49** or other networked devices, including peripheral device **105**. The remote computer (or computers) **49** may be represented by another computer system, a server, a router, a network PC, a peer device or other common network node, and typically includes many or all of the elements described above relative to the system **20**, although only a memory storage device **50** has been illustrated. The wired or wireless connections may include a local area network (LAN) **51** or a wide area network (WAN) **52**. Such networking environments are common in offices, enterprise-wide computer networks, Intranets and the Internet.

When used in a LAN networking environment, the system **20** is connected to the local network **51** through a network card or adapter **53**. When in a WAN networking environment, the system **20** typically includes a modem **54** or other means for establishing communications over the wide area network **52**, such as the Internet. The modem **54**, which may be internal or external, is connected to the system bus **23** via the serial port connector **46**. In a networked environment, program modules depicted relative to the system **20**, or portions thereof, may be stored in the remote memory storage device. It will be appreciated that the network connections shown are exemplary and other means of establishing a communications link between system **20** and other computer systems may be used.

As used in this application, the terms "component," "module," "system" and the like are intended to include a computer-related entity, such as but not limited to hardware, firmware, a combination of hardware and software, software, or software in execution. For example, a component may be, but is not limited to being, a process running on a processor, a processor, an object, an executable, a thread of execution, a program, and/or a computer. By way of illustration, both an application running on a computing device and the computing device can be a component. One or more components can reside within a process and/or thread of execution and a component may be localized on one computer and/or distributed between two or more computers. In addition, these components can execute from various computer readable media having various data structures stored thereon. The components may communicate by way of local and/or remote processes such as in accordance with a signal having one or more data packets, such as data from one component interacting

with another component in a local system and/or across a network such as the Internet with other systems by way of the signal.

In one or more aspects, the functions described herein may be implemented in hardware, software, firmware, or any combination thereof. If implemented in software, the functions may be stored or transmitted as one or more instructions or code on a computer readable medium. Computer-readable media includes both computer storage media and communication media including any medium that facilitates transfer of a computer program from one place to another. A storage medium may be any available media that can be accessed by a computer. By way of example, and not limitation, such computer-readable media can comprise RAM, ROM, EEPROM, CD-ROM or other optical disk storage, magnetic disk storage or other magnetic storage devices, or any other medium that can be used to carry or store desired program code in the form of instructions or data structures and that can be accessed by a computer. Also, any connection may be termed a computer-readable medium. For example, if software is transmitted from a website, server, or other remote source using a coaxial cable, fiber optic cable, twisted pair, digital subscriber line (DSL), or wireless technologies such as infrared, radio, and microwave, then the coaxial cable, fiber optic cable, twisted pair, DSL, or wireless technologies such as infrared, radio, and microwave are included in the definition of medium. Disk and disc, as used herein, includes compact disc (CD), laser disc, optical disc, digital versatile disc (DVD), floppy disk and Blu-ray® disc where disks usually reproduce data magnetically, while discs usually reproduce data optically with lasers. Combinations of the above should also be included within the scope of computer-readable media.

The methods described herein have been provided in connection with flow diagrams that facilitate a description of the principal processes; however, certain blocks can be invoked in an arbitrary order, such as when the events drive the program flow such as in an object-oriented program. Accordingly, the flow diagram is to be understood as an example flow and that the blocks can be invoked in a different order than as illustrated.

It should be noted that while much of the forgoing description has related to a system and method for sleep management, the systems and methods disclosed herein can be applied in a broad range of settings beyond sleep management. By way of example, the systems and methods described herein can be modified to provide scheduling updates and/or notifications, and to adjust scheduling preferences and settings in response to control signals generated based upon received external data.

In the interest of clarity, not all of the routine features of the implementations described herein are shown and described. It will be appreciated that in the development of any such actual implementation, numerous implementation-specific decisions must be made in order to achieve the developer's specific goals, such as compliance with application-related constraints, and that these specific goals will vary from one implementation to another and from one developer to another. Moreover, it will be appreciated that such a development effort might be complex and time-consuming, but would nevertheless be a routine undertaking of engineering for those of ordinary skill in the art having the benefit of this disclosure.

Furthermore, it is to be understood that the phraseology or terminology used herein is for the purpose of description and not of limitation, such that the terminology or phraseology of the present specification is to be interpreted by the skilled in the art in light of the teachings and guidance presented herein, in combination with the knowledge of the skilled in the relevant art(s). Moreover, it is not intended for any term in the specification or claims to be ascribed an uncommon or special meaning unless explicitly set forth as such. The various embodiments disclosed herein encompass present and future known equivalents to the known components referred to herein by way of illustration. Moreover, while embodiments and applications have been shown and described, it would be apparent to those skilled in the art having the benefit of this disclosure that many more modifications than mentioned above are possible without departing from the inventive concepts disclosed herein.

What is claimed is:

1. A sleep management device, comprising:

a processor operatively coupled to a memory, wherein the processor is configured to control operation of the sleep management device;

a display included with the sleep management device that is operable to display at least the time of day;

an audio reproduction device associated with the sleep management device that is operative to output audio; and

at least one connector that is configured for docking a consumer electronic device to the sleep management device;

wherein, when the consumer electronic device is docked to the sleep management device and further wherein when the consumer electronic device operates a sleep management application, the sleep management device is authenticated so as to be responsive to the sleep management application and further comprising a communication link to a remote server having external data pertaining to the consumer electronic device or to a user of the consumer electronic device;

wherein the sleep management application, when executed by the consumer electronic device, causes the consumer electronic device to:

initiate communications over the communication link between the sleep management application and the remote server;

receive the external data from the remote server;

analyze the external data to identify elements that pertain to the sleep management application;

generate a control signal based on the identified elements;

modify a setting governing an operation of an alarm function in accordance with the control signal; and

activate the sleep management device in accordance with the modified setting.

2. The sleep management device of claim **1**, wherein operation of the sleep management device is controlled using the sleep management application.

3. The sleep management device of claim **1**, wherein the sleep management application generates a custom interface that reflects functionality of the sleep management device.

4. The sleep management device of claim **1**, wherein the sleep management application, when executed by the consumer electronic device, causes the consumer electronic device to:

update a user account in response to an operation of the sleep management application.

5. The sleep management device of claim **4**, wherein the user account includes user activity information.

6. The sleep management device of claim **4**, wherein the user account includes a user sleep profile.

7. The sleep management device of claim 4, wherein the sleep management application, when executed by the consumer electronic device, causes the consumer electronic device to:

analyze the user account to identify behavioral trends.

8. The sleep management device of claim 1, wherein the external data comprises location information.

9. The sleep management device of claim 1, wherein the external data comprises weather information.

10. The sleep management device of claim 1, wherein the external data comprises traffic information.

11. The sleep management device of claim 1, wherein the external data comprises scheduling information.

12. The sleep management device of claim 1, wherein the sleep management application, when executed by the consumer electronic device, further causes the consumer electronic device to present the control signal to the user prior to the modifying step.

13. The sleep management device of claim 12, wherein the sleep management application, when executed by the consumer electronic device, causes the consumer electronic device to receive an input from the user approving or denying a modification in accordance with the control signal, after the presenting step.

14. The sleep management device of claim 1, wherein the sleep management device is authenticated so as to be responsive to the sleep management application when the consumer electronic device is docked to the sleep management device in a wireless manner.

15. The sleep management device of claim 1, wherein the sleep management device is authenticated so as to be responsive to the sleep management application when the consumer electronic device is docked to the sleep management device in a wired manner.

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